ICI MAGAZINE

OCTOBER/NOVEMBER 1964

"First and Foremost"

or the rise of 'Procion' dyestuffs

COLOUR . . . bold, brilliant splashes of it . . . is enlivening the contemporary scene in all directions. Clothes, furnishings,/*continued overleaf*

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1. 'Procion' tie-dyed fabric by Mrs P. Winn
2. 'Fabiola' 'Procion' print by Warner & Sons Ltd.
3. 'Procion'-dyed table linen

combine with the fibre chemically, giving bright shades of unbeatable wash-fastness on cottons, linens and rayons.

A nine-day scientific wonder, however, isn't necessarily a great commercial success. But the ICI teams working on the development of 'Procion' dyes knew that they were good. Valuable help was forthcoming from the UK textile trade, which was quick to appreciate the virtues of the new dyes. 'Procions' are now big export business for Dyestuffs Division, but it is the British textile firms—sometimes accused of inflexibility and over-caution—who have been foremost in exploiting their qualities. The result: 'Procions' have climbed steadily to the top and are staying there. The original three 'Procions' have expanded into a

3 & 4. 'Procion' prints by Cepea Fabrics

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strongly influenced by 'Procion' dyes.

The fastness of 'Procion' dyes is invaluable to those who have to dress on a budget but who want to ring the changes and not always be forced to plump for the duller "safe" styles. For washable items, 'Procion' dyed or printed fabrics are ideal; their wash fastness is impeccable. In 1964 almost two out of three of all dress prints in the UK used 'Procion' dyes. With an eye on the remaining third (and on the big overseas markets) Dyestuffs Division have introduced a new service for the fashion trade in offering its " 'Procion' Designers' Colours," based on 'Procion' dyes, to the world's foremost textile designers. The

3. 'Procion'-dyed raincoat and anorak by Barr, Muir Ltd.: dyed by J. Mandleberg & Co. Ltd.
4. Raincoat with 'Procion'-dyed lining, by Courtaulds Ltd.
5. 'Procion'-dyed 'Viyella' shirt by W. Hollins & Co. Ltd.

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Mond Division *by D. H. Carter*

In the chemical industry more than in any other, techniques alter, processes come and go, raw materials become uneconomic and are replaced by others. Because of this, plants are built, used and demolished; firms flourish, or fail to do so, amalgamate, and close down their no longer wanted activities; organisations, appropriate at one stage, become inappropriate in the next and need constant revision.

Mond Division inherits a long and varied history that represents more than a century's determination to keep abreast of and often to lead in technological change. Together with that change has marched the complementary change in company structure.

The historical antecedents of Mond Division rest on three discoveries; perhaps it would be more accurate to call them precise applications of diffuse contemporary chemical knowledge. They are, first, Nicholas le Blanc's patent of 1791 recording a procedure for making sodium carbonate, a coordination of several known and published steps. Secondly, in 1811 Augustin Jean Fresnel, of biprism fame, chanced on the reaction between brine and ammonium carbonate that gives sodium bicarbonate, from which sodium carbonate is readily derived.

Fresnel made no use of his observation, but interest in it grew in Great Britain, and the first ammonia-soda was made in Scotland in 1836. It was not until 1863, however, that techniques had advanced far enough for Ernest Solvay to utilise his brilliance as a chemical engineer to build and operate the first successful ammonia-soda plant, at Couillet in Belgium.

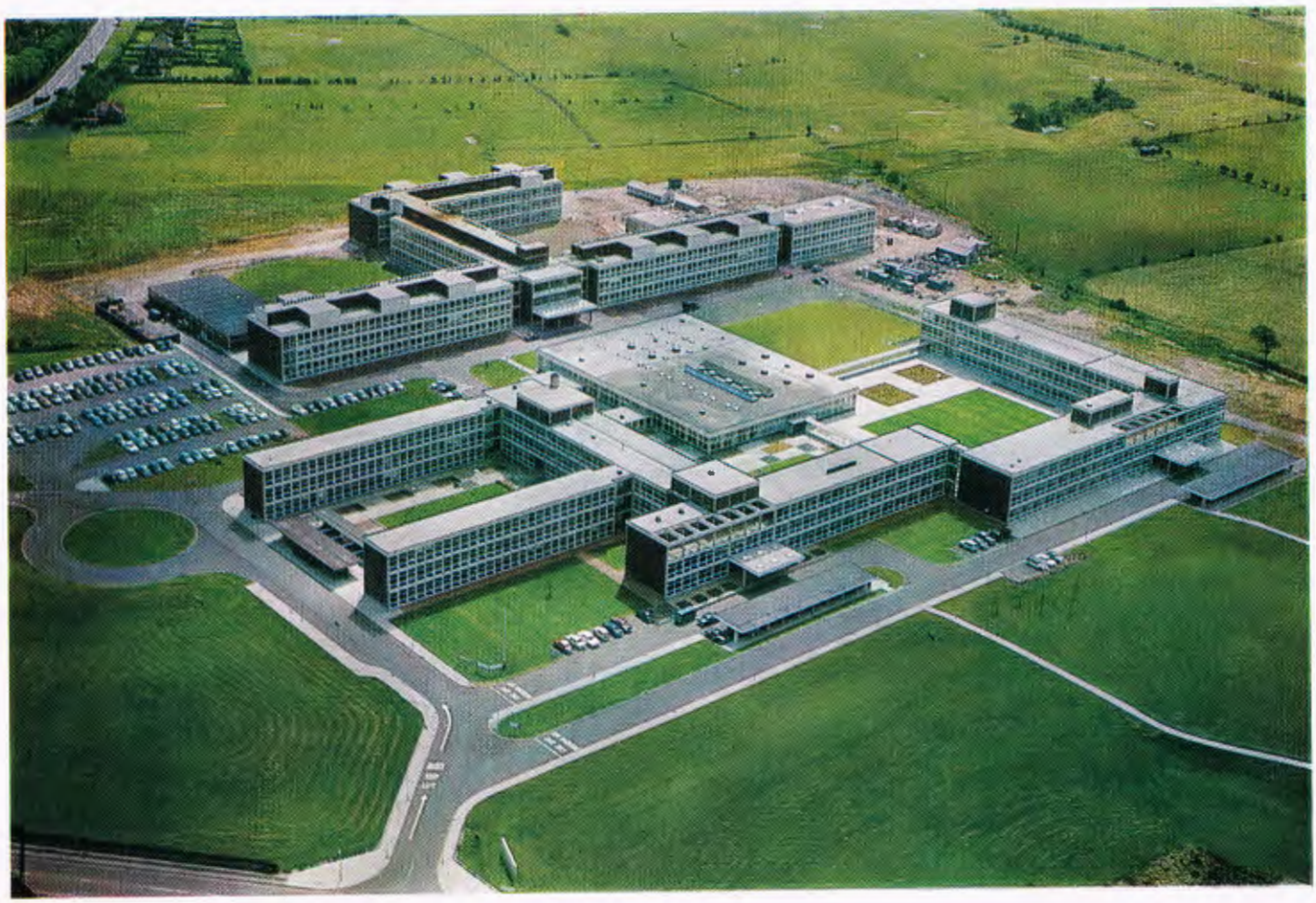
Finally, the discoveries of Faraday, coupled with further improvements in mechanical techniques, particularly in the large-scale generation of electricity, facilitated the rapid development of Hamilton Young Castner's 1892 patent for a mercury cell that gave sodium hydroxide (caustic soda) and chlorine as co-products.

Curiously enough, Castner was not interested (at first) in chlorine; he wanted extremely pure sodium hydroxide for electrolysing to produce sodium for his aluminium process. It is the growth in the demand for electrolytic chlorine and its inevitable co-product sodium hydroxide that provides the rationale for Mond Division.

Early History

Ludwig Mond, who had studied under Bunsen at Heidelberg, developed a method for recovering sulphur from the

Mond Division offices and the Petrochemical and Polymer Laboratory, Runcorn Heath



by reacting lime and sodium carbonate in a chemical process that has been known some 2000 years. But the demand for chlorine has been growing at a rate higher than the steady increase in demand for alkali, so the critical period has now been reached when the output of electrolytic sodium hydroxide (made by the ex-General Chemicals Division) is now much greater than the output of lime-soda sodium hydroxide (made by the ex-Alkali Division). In fact the time is not far distant when the chlorine demand will outstrip the demand for sodium hydroxide, and the excess sodium hydroxide will have to be turned into sodium carbonate, thus replacing, eventually, the Solvay procedure.

This was foreseen, and in 1961 discussions that culminated in the formation of Mond Division were begun.

The Present Structure

Some idea of the problems involved in consideration of a suitable organisation for Mond Division may be gained from consideration of the facts that at the time of the merger the sum total of products was 289; 139 from the Alkali side and 150 from General Chemicals. Personnelwise the staff numbered 7000 and the payroll 14,000 making some 21,000 in all.

It was clear that such a colossus—as big as the whole of ICI in 1927—could not remain alive unless there were a thorough and radical deployment of responsibility.

It seemed clear that no one man could, particularly on the sales side, cover adequately the enormous range of products of the new Division. Responsibility, especially at the top, had to be broken down into narrower fields.

To divide the Division in accordance with the market did not seem a happy solution, partly because many of the major products are sold to practically every trade in the country, and partly because of the technical and manufacturing interlocking of products.

Thus it seemed more practical to group together the technically related products rather than try to devise sections that would deal with particular branches of industry.

In fact, five Product Groups were formed, each the responsibility of one or more Division directors. The headquarters staff of each group consists of sections covering the functions of some of the erstwhile separate Technical, Operations (production), Sales Control and Technical Service departments, which used to deal with the whole range of products.

Certain other service functions such as finance, distribution, supply, engineering, research, safety, work study and personnel are still provided centrally by departments under the control of Division directors.

The Product Groups are encouraged to appoint individuals and not committees to decide their tactical and day-to-day problems. The limits of expenditure which certain senior managers may authorise has been considerably increased.

The Executive Committee, consisting of the Division Chairman and his deputy Chairmen, is the instrument by which the former is enabled to arrive at more major decisions based on the advice of his senior colleagues. One of its chief tasks is the monthly monitoring of the affairs of the Products Groups in much the same way, but, of course, in greater detail, as the Divisions themselves are called to account every six months by their ICI Control Group.

The Product Groups

The largest product group is *Group A*, with its headquarters at Winnington. It inherits the production facilities of the former Alkali Division and the chlorine production of the former General Chemicals Division. The main products are soda ash and chlorine, both for sale and for use by Groups B and C, and caustic soda. Other, less important, products bring the total to 37.

Both in soda ash and in chlorine, Group A ranks with the world's largest producers. In ash, Group A, together with their long-established partners Solvay et Cie., have dominated the world's markets

Winnington Works

The Shipping Market

by David Hunter

The Baltic Exchange, London

Shipping—looked at from a Division as the author did for 20 years or so—appeared to be something of a mystery, romantic perhaps, but riddled with archaic and restrictive practices. Now, after a period of exposure in the central department concerned, he has been asked for an account of how it appears from a closer viewpoint.

Based as we are upon a small island, it is not surprising that ICI's world-wide interests are deeply involved with shipping. Much of our raw material and all our exports, except for the minute but developing proportion which as yet goes by air, must be carried by sea. In round terms ICI presently spends on its own account, which excludes most of its petroleum feedstocks, about £10m. per annum on shipping services.

The most striking point about ICI's exports is their extreme diversity. They range in scope from some hundreds of thousands of tons per annum of basic products such as alkalis or fertilizer to compact ones like dyestuffs, pharmaceuticals, or crop protection chemicals. It may take the whole of one ship to move a consignment of the former, but an entire year's exports of the latter could be put into the same ship were it not for the need to distribute them at regular intervals to any of the 700 ports which we use throughout the world.

Another feature is the variety of potentially hazardous items, including materials which are flammable, toxic, corrosive, and even explosive, in addition to all the innocuous ones. Explosives, or a very hazardous product like carbon disulphide, for instance, not only involve the negotiation of terms and conditions but indeed sometimes call for persuasion to get them carried at all. Successive international conventions designed to safeguard life at sea have caused the various nations to draw up regulations as they think fit to fulfil their purpose, but the final say as to whether or not to carry something dangerous understandably lies with the ship's master.

Shipping is an international industry with wide and often obscure ramifications. Around the year 1900, British shipping accounted for nearly half the world's tonnage. Although its proportion has declined to only about 15% today, with some 22m. gross tons it still heads what has progressively become a very much larger league table. The industry sets out with its ships to perform two distinct functions, those of liners and tramps. Ocean liners are usually large ships which are operated on scheduled services to fixed ports of call carrying general cargo for all and sundry. It takes very many consignments from a multitude of shippers to make up the full cargo of any one of them, and these have to be sent to the ship at the port and berth from which it is advertised to sail. Tramp ships, on the other hand, are hired complete or

progressing of this large volume of shipments and the clearance of imports, on most of which duty has to be assessed and paid, requires physical proximity to the shipping line offices, Customs and Port Authorities, foreign Consuls, and the like. Provision, too, has to be made for arrangements which do not always go according to plan, since the sea is ever unpredictable and can produce sudden and unexpected emergencies. In one stormy week last winter, for instance, drums of cyanide broke loose and threatened to react with other chemicals in the hold of a ship in the South Atlantic, a Dutch coaster had to be abandoned in the Bristol Channel when a cargo of sodium started to explode on deck, and drums of a highly inflammable liquid being imported from the USA were washed overboard from a ship in the Irish Sea. This latter incident resulted, when the drums fetched up on Lancashire's shores, in telephone calls from the coastguard asking in characteristic northern accents "Is that the ICI"? The competent technical help which is so readily forthcoming from Divisions when such incidents occur does much to enhance the reputation of the Company among those upon whose services our overseas trade so much depends.

The chartering group of the department is located in London, which is the best place for dealing with brokers and tramp shipowners. The resident manager there is a member of the Baltic Exchange, which is a valuable source of intelligence on world shipping generally. Where ICI has large and charterable cargoes, he acts as our counterpart to the brokers whom we select, and through whom shipowners of all nationalities make their bids. The ensuing negotiations may have to be instantaneously concluded or can extend over a period, even of many months. This is a rapidly developing side of our business involving not only dry cargoes but also liquids. These include solvents, alcohols and acids, which are increasingly being carried in bulk, particularly in what have come to be known as parcel tankers because they cater for composite cargoes of different products from a hundred tons or so upwards. More recent still has been the development of tankers carrying gaseous products under pressure, and very shortly these will be moved under refrigeration also. Despite geographical separation a close connection is maintained between the chartering and liner groups, since, when tonnages reach a certain level, the corresponding sides of the shipping market are touched at a point where competition can be stimulated.

Lastly, mention should be made of the third group of the department recently formed to co-ordinate arrangements for European traffic, where any distinction between sea and land transport tends to get blurred. By combining Division streams this traffic has been concentrated on sea link arteries, notably from the Tees to Rotterdam, and Runcorn to Dublin. From Rotterdam deliveries fan out over most of Central Europe and are attended to for onward transport by ICI (Holland) N.V. The artery to Dublin covers Eire and is operated in conjunction with ICI (Ireland) Ltd., but is slightly different, since this service is independently organised by ICI, using chartered shipping.

The short sea links to Europe serve to emphasise how shipping generally is but a part of ICI's overall distribution services. As such, it is proving susceptible, however slowly—to go back to those archaic practices—to the same sort of improvements in materials-handling which are being applied to all other forms of transport. These include the movement of goods in bulk, by unit loads, on pallets, and in containers. A useful maxim, then, after allowing for the necessary civilian adaptation, is one coined by the American Air Force during the war when they were developing the technique of air supply. It described their object as "from factory to foxhole—untouched by human hand"!

Bulk salt from Weston Point Works is transferred from a Mond Division craft at Liverpool docks to a liner which is bound for New Zealand

Mr. S. Howard of Pharmaceuticals Division

He is chairman of an enterprise employing some 2400 people, a high proportion of them with scientific training, and a current investment capital of some £20 million.

Decidedly, it is also a concern with a challenging growth potential.

Readers who remember the article which he wrote for the *Magazine* on the work of the Pharmaceuticals Division may recall his closing words:

> "It is a great privilege to be associated with the Pharmaceuticals Division. Not everybody is fortunate enough to have a job which offers the opportunity of using to the full every bit of scientific, commercial and industrial experience which he possesses, and at the same time of being very certain that what he is doing is worth while when judged by the most exacting standards. Consciousness of this privilege seems to be universal in the Division—in all ranks and functions—and it is indeed an inspiring atmosphere in which to work."

Sam Howard, as most people speak and think of him, is an old Dyestuffs Division man and carries much of the Dyestuffs Division manner with him—raciness of expression, deadpan humour, down-to-earthiness and no frills. You underestimate it at your peril, for the frills are there all right—when needed—and the lads from Blackley have given an easy tumble to many an unsuspecting innocent who may have imagined that he had the edge on them in sophistication.

He is both a man of business and a man of vision. His hand is kept on the pulse. He can tell you from day to day how the Division's sales are going and from month to month how the sales of each product are showing. These statistics are fed to him from a computer. If these figures suggest that any significant deviation from the expected is occurring, Sam Howard will want to know why. But more often than not he will have received advance warning and the figures will confirm rather than refute previous calculations.

He regards management as the very foundation of successful business but looks upon forward thinking as no less important. Recently his top advisers have been working on ten-year speculative forecasts covering the shape of things likely to come in their own particular fields of operation.

He likes as many of the Division Directors as conveniently can to take lunch together—he looks on such gatherings as informal board meetings and finds that this is what they turn out to be, but with just that mellowing background that makes the intractable lower their guard!

Sam Howard talks of his senior executives as "My boys." "I really mustn't," he will say, "why, some of them are older than I am!" A moment later, "I wonder what my boys will say to this . . . ?"

Like most Division Chairmen, he is a widely travelled man. The eastern seaboard of the US, in particular, is familiar to him and he has innumerable American contacts. This year and next he is President of the Association of British Pharmaceutical Industry. He has perforce to be sociable, but one senses that he is so by inclination.

On a typical morning at Fulshaw Hall he will start the day by going through the massive correspondence which has accumulated during one of his enforced absences—in London, let us say, for a meeting with the Capital Programmes Committee or to give a talk down at Warren House. His secretary and he will have a busy forty minutes or so. Next he may receive one of his deputy chairmen and have a report from him about various decisions taken in his absence and himself give a decision on one or two matters that have been reserved for his own consideration. He in his turn will report on the latest that he has learned, observed or speculated upon on his travels. Together they will sketch out some lines of action which they wish to be taken or some questions that need to be examined.

Next he may have various reports to consider or even one of these long-term forecast-essays to read through—always, for him, a most stimulating experience. This may be interrupted by the arrival of his Personnel Director with a staff matter to consider. Sam Howard approaches any problem of another's welfare with the seriousness he would give to his own.

It will now be time, and even past time, for one of those informal "board meetings" already mentioned. He will, notwithstanding, be able thoroughly to relax. Relaxation is the secret of their efficacy.

After lunch he will have the daily sales figures brought to him, more callers, a backlog of telephoning, and perhaps one of those emergency appointments wired from London which mean the rearrangement, with his secretary's aid, of the next week's already jigsaw-looking programme.

At home he is both family man and gardener. Sam Howard has a delightful garden, and it is a pointer to the generosity of his nature that he is as enthusiastically planning in the garden for the enjoyment of those who will come after him as he is for his own.

For what will he be chiefly remembered? Setting apart entirely his commercial achievements and the foundations of future expansion which he and his "boys" will have laid, setting apart, too, his own warm personality, it may be that his monument in the Division will be his inspirational siting of the Division's new restaurant—at no greater cost than had it been in the most conventional of locations, be it noted—abutting on the artificial lake in the Stanleys' former Italian garden, presently being cleared and restored from jungle-like overgrowth and decay. Nothing could exaggerate the charm and beauty of the setting as it will be—an amenity unsurpassed of its kind anywhere. Future generations at Alderley Park will have cause to be grateful to Sam Howard for the imagination which took in the possibilities of this seemingly unpromising prospect and transformed it into something of such novelty and delight.

making the largest contribution to the country's energy economy. Though some of the 22 groups and individual companies receiving licences were almost unknown in this country, the most substantial areas had all gone to applicants which either had, or were backed by, concerns with household names.

New Division chairman

Dr. C. R. Mavin, who took over last month as chairman of Dyestuffs Division on the retirement, due to ill health, of **Dr. John Avery,** has spent all his ICI career with the Dyestuffs Division, which he joined as a research chemist in 1933. He was appointed assistant works manager of Blackley Works in 1942, works manager at Huddersfield in 1947 and production manager of the Division in 1953. Two years later he joined the Dyestuffs Division Board as director in charge of production, and in 1957 he was made a joint managing director, the post he held until, on the recent reorganisation of Division Boards, he was appointed a deputy chairman.

At the end of the last war he was

Dr. Mavin

one of the BIOS team which investigated and reported on chemical techniques in Germany, and he is a member of the ICI Research Advisory Council and on the Boards of British Nylon Spinners and the European Council.

Dr. Mavin's main interests outside work are golf—he once had the distinction of playing with Dai Rees—gardening and photography.

A foot in both camps

The first two appointments have been made in a new pilot scheme for joint research posts just launched by ICI and three British universities, Edinburgh, Liverpool and Manchester.

The scientists appointed under this scheme will carry out research programmes in ICI laboratories, but will be available for about a quarter of their time to teach in university science departments. The subjects for research will be chosen so as to be relevant to the teaching programme, which will include reference to current industrial trends and practice. Salaries of those appointed will be paid jointly by the universities and the Company.

The first two appointments are in chemistry, at the Universities of Edinburgh and Liverpool. **Dr. B. J. Woodhall,** a Birmingham graduate, and **Dr E. Robson,** a Sheffield graduate, both until recently doing post-doctoral research in the USA, started work at the ICI Petrochemical and Polymer Laboratory at Runcorn last month. Dr. Woodhall is to spend the whole of one term a year at Edinburgh, and Dr. Robson will teach at Liverpool for two days each week during term time.

'Terylene' reaches the 100 million lb. mark

Plans for increasing 'Terylene' fibre production by about 25%, bringing production capacity up to 100 million lb. a year, were announced by Fibres Division at the end of August. The major increase will be in the production of staple fibre and tow, which will be made at Wilton from polymer made by a continuous polymerisation process recently developed by the Division

The prilled ammonium nitrate plant at Severnside Works—the only one of its kind in the UK—is now at an advanced stage of construction and will start large-scale production early in 1965. The plant is part of ICI's latest £20m. fertilizer development programme and has been designed to produce 300,000 tons a year of a new high-concentration nitrogen fertilizer. The fertilizer is sprayed in the form of spherical droplets from the top of the 328 ft. high tower shown in the photograph, the droplets hardening into prills as they fall to the bottom. The tower is already a landmark in the Bristol area and can easily be seen from the Welsh coast

and its associate company in the USA, Fiber Industries Inc. Existing polymer manufacturing capacity at Wilton employs the original batch process, after which the polymer must be blended and remelted; the new process allows the molten polymer to be used as it is made.

The expansion of fibres capacity will involve corresponding expansion in the production of intermediate products and polymer, which will be sufficient to provide raw materials also for 'Terylene fibre plants now being built overseas.

'Terylene' plant for Russia

The largest single deal in Anglo-Soviet trading history reached final agreement on 7th September with the signing of the first part of a polyester fibre plant contract between V/O Techmashimport, the Russian purchasing agency, and Polyspinners Ltd., a British company composed of Constructors John Brown Ltd. and Dobson and Barlow Machinery Sales Ltd. (a subsidiary of Stone-Platt Industries Ltd.) acting in collaboration with ICI, who are providing technical "know-how" and advice.

The agreement covers the supply of a major part of a polyester fibre plant to the USSR and is valued at roughly £30 million. Negotiations are well advanced for the supply of the remaining ancillary plants, which will bring the total contract to £40 million. Constructors John Brown will be responsible for the design and erection of all the chemical plant, and Dobson and Barlow will undertake the commissioning and supply of the textile processing equipment.

The new factory, to be built at Krasnoyarsk in Siberia, will have an output of around 50,000 tons of polyester fibre a year and will employ 3500 people.

Film Festival choice

Powder and Shot, a new colour film made by the ICI Film Unit for IMI (Kynoch) is one of fifteen British films picked to be shown at the International Industrial Film Festival, which is being held in London next month. The fifteen films selected as the official British entry were chosen from over 200 submitted. Written and directed by **Peter Rawson** and produced by **Graham Hadow,** the main purpose of *Powder and Shot* is to emphasise to shooters the importance of good ammunition and to show the care taken by IMI to produce such ammunition. It also deals with the manufacture and testing of guns.

Locations for the film included the IMI factory at Witton and their works at Edmonton in North London, where lead shot for ammunition is still made in a shot tower; the Gun Barrel Proof House in Birmingham, one of two in the country, where the barrels and actions of all new sporting guns have to be tested; Poole Harbour for wildfowling scenes and a grouse moor in Scotland where the going was so rough that the unit's equipment had at times to be moved on ponies. The film also includes a re-enactment of the famous rook shoot in *Pickwick Papers*.

New research centre

The new ICI Research Centre at Runcorn Heath in Cheshire is now in full operation. The Centre provides new laboratories for the Mond Division and provides premises also for the new ICI Petrochemical and Polymer Laboratory, which has been established to undertake long-range research on behalf of the Company as a whole.

The completion of the impressive new complex was marked last month by a series of open days for some 200 academic visitors from universities with which the two laboratories are in constant touch and from which many members of the staff are recruited.

The brain drain reversed

Much has been written of the brain drain of young scientists to America. It is pleasant, therefore, to be able to report that among the new staff in the Petrochemical and Polymer Laboratory are 12 young British scientists who have joined the Company immediately after completing post-doctoral work in North America.

Four of these are from Canadian universities or research establishments and eight from the United States. Six more men, at present still in America, will be joining the Laboratory toward the end of 1964; and many others, still in the US, have arranged to visit Runcorn so as to consider joining the Laboratory.

Seven-man guard

A police superintendent, a sergeant and five constables formed the bodyguard of **Mr. Kevin Howley** (Engineering Works, Billingham) when he visited Montevideo recently to referee the final of the South American Club Championship Cup. A soccer referee for 21 years, Mr. Howley said on his return from the match: "I enjoyed the trip, but the match did get a bit nerve-racking at times. Every time somebody scored a goal the air above the stadium was like an ack-ack barrage, with firecrackers going off left, right and centre."

Since he started refereeing in 1943 Mr. Howley has refereed nearly 400 football league games besides many others. As well as his South American trip he has also officiated at matches in Germany, Spain, Portugal, Austria and France. But he rates a game between Manchester United and West Bromwich Albion in 1958 as the best he has ever refereed. This was the sixth round F.A. Cup replay just after the Munich air disaster, and he will never forget Manchester coming through in the last minute to score a goal which took them on to Wembley.

Sequel to a success

Eric (F.R.) Cooper, late of Central Personnel Department, contemplates following up his biography of his great-grandfather, Frederick Fox Cooper—which he entitled *Nothing Extenuate*, and which was most favourably received by the critics—by a sequel. *Nothing Extenuate* (Barrie and Rockhill) dealt with the uncertain fortunes of one who was in turn journalist, actor, playwright, theatrical manager, and much else besides that could be properly called bohemian. The sequel will carry the family history a stage further, but its central "character" will be a play rather than a person—*The Swiss Express*. This was a popular drama of its day, which toured the United Kingdom uninterruptedly from 1892 to 1910, a feat not to be compared, of course, with those of the Savoy Operas or *Charley's Aunt* in the matter of longevity but still enough to earn for it a niche in the history of British theatrical long-distance runners. If Mr. Cooper puts as much patient research and talent for entertaining detail into *The Swiss Express* as he did into *Nothing Extenuate*, it will be something to look forward to.

RETIREMENTS

Some recent retirements announced are:

Agricultural Division: Mr. E. Beesley, process investigation manager (retired 31st August).

Dyestuffs Division: Dr. J. Avery, chairman (retired 31st August).

Head Office: Mr. R. H. Dibb,

Anything else for cleaning? Miss Beryl Williams, a shorthand-typist in Mond Division's Technical Service Department, places a bundle of garments for dry cleaning in the coin-operated machine which the Division has acquired for experimental purposes. Mond Division, as a major supplier of solvents to the dry cleaning industry, is taking a keen interest in these machines, which have been steadily gaining in popularity since their introduction into Britain two years ago

Part of an aerosol pressure filling line in Mond Division's 'Arcton' laboratories at Runcorn Heath, which have recently been extended to include new formulation laboratories. The laboratories carry out research into the creation of new aerosol products, the adaptation of existing products to enable them to be packed as aerosols, and the improvement of existing aerosol products

ICI silicones from Nobel Division were used to give a hygienic non-stick finish to the giant pie dish specially constructed for baking Denby Dale's 18 ft. long, six-ton pie. The pie was baked to celebrate the births of four royal babies and is the seventh monster pie produced at Denby Dale. The first, in 1788, was baked to commemorate the recovery of George III from illness

product unknown five years ago, we are already operating our third fundamentally new process and the end may not yet be in sight. This is also the case for existing products, especially in respect of production from new raw materials. Here it becomes a matter of great difficulty to decide between recently established new processes and others, possibly better, in which even less experience has been gained. The life expectancy of plant becomes frighteningly short. But Mond Division and its predecessors have led the world in technology in the past and have every intention of continuing to do so.

So much for the established products. What of the new products ? If we in Mond Division are to have a lion's share of the trade in the '70s, much of it must, on past experience, be in products not now made. Because the development period of new products is long, the pipeline must be kept full. Here too we feel confident of the future.

Mond Division's predecessors had a long record of success in developing new products. It will not be forgotten that polythene was invented at Winnington. For the distant future, Mond, with the rest of ICI, have now the help of the Petrochemical and Polymer Laboratory, whom we recently welcomed at Runcorn to share the Heath site and its facilities. For new products, the emphasis is two-fold—development of a new process to make the product and development of the detailed know-how in the use of the product for the customer. Applications research has been increased, and this has already begun to bear fruit.

Of two things one can be certain: the future will be highly interesting, and it will involve us in continuing change.

Mond Division faces a tremendous challenge if it is to remain in the forefront of the chemical industry. Equipped by the experience and knowledge gained in the past by its constituent Divisions and by the possession of a newly created organisation geared to the needs of the future, the challenge is willingly accepted.

tools are needed. They are required to forge, machine, extrude and press the metal to suit the needs of the engineer. Tools begin their life in a soft condition so that they themselves can be shaped; then, in order that they can do work on other pieces of metal and cut or form them, they must be hardened. Mond Division provides special heat treatment salts for the development of optimum properties in tools, as well as case-hardening salts, by the use of which a hard durable skin can be formed on the wearing parts of machinery, whether they are hidden deep inside the engine of a motor car or are part of the motion work of a sewing machine.

Most of the chemicals used by the engineering industry form part of a process. In heat treatment, to take one example, not only does ICI provide the salt, but also the furnaces in which the salt is used. Several such furnaces, with different salts and operating at different temperatures, may be required to heat-treat a piece of tool steel and, due to the increasing complexity of these processes, the supply of chemicals and plant has to be backed up by the necessary know-how to ensure that our products are used to the best advantage and to the customer's complete satisfaction.

Metals often have to be soft in order that they can be shaped. This softening or annealing process requires a high temperature which affects the surface conditions of the metal, and ICI helps the engineer to overcome these problems by the provision of protective atmospheres derived from Agricultural Division's ammonia. In addition to preventing scale formation during annealing, ammonia-derived atmospheres can also help in the hardening and tempering of carbon and alloy steels and in the joining together of metal parts by brazing.

Once again, in order to use the basic chemical product efficiently and economically, ICI provides the correct equipment and technical advice to the customer. We sell to the engineer, in effect, a process rather than a product.

At many stages in the fabrication of metal articles, oil or grease or formulations of them (such as cutting oils, pressing and drawing lubricants, protective oils, etc.) which are essential assistants in the working of the metal, have to be removed so that the progress of the work can be inspected or because of the nature of following operations. Many products of the engineering industry rely on quite complicated metal-finishing techniques for their durability, because without paint or electroplating and other protection motor cars would speedily rust and washing machines grind to a standstill. Finishing is also important because the choice of what we buy is often influenced by the appearance of the article. Before these finishing processes can be carried out it is essential to remove oil, grease, rust and scale from the surface of the articles.

Two of the most important methods in general industrial use for removing oily and greasy contamination involve the use of chlorinated solvents (particularly 'Triklone') or of alkali cleaning compositions, both of which are supplied by Mond Division. Paints Division also makes a wide range of cleaners especially suitable for use prior to phosphating or other aqueous treatments. Mond Division offers a range of standard, open-topped solvent degreasing plants, as well as designing and manufacturing special plants to meet customers' particular requirements. A spectacular example of such a special plant

Limestone is fed into an open-hearth furnace during "fettling"

effectively protected from rusting by this process.

Phosphate coating on ferrous parts finds yet another application. The owner of a new car knows the emphasis that is placed on the avoidance of high speed during the initial running-in period. The problem of excessive wear on moving parts troubles all makers of machinery, and ICI 'Granodine' can effectively deal with the problem of initial wear, and also helps prevent subsequent seizure, corrosion, and excessive wear of moving parts during the life of the machine. For example, 50% of the piston rings produced in this country are given a phosphate coating to improve their performance, and the majority of them are treated with 'Granodine.' When it is oiled the phosphate coat acts as a thin sponge on the bearing surface, helping to retain oil and eliminating tearing and scuffing of the metal.

The once universal dominance of iron and steel is today being challenged. The increasing use of certain aluminium alloys highlights a specialised use for nitrate of soda and sodium nitrite, both products of Agricultural Division, in heat treatment processing. Paints Division's range of 'Alocrom' aluminium pretreatment solutions helps to solve, for example, the problem of ensuring adequate adhesion of a paint film on aluminium. And aluminium television aerials or the outside cladding of a power station can be given additional corrosion protection by the use of 'Alocrom' even without the need for any subsequent paint finish.

One way to eliminate the need for pretreatment and painting is to use plastics. A glance at many of the articles in present use shows to what extent plastics components have displaced metal, particularly in light engineering and the manufacture of domestic equipment.

A number of basic facts govern the acceptance of plastics by the engineer. There is the cost as compared with metals, suitability for the application, ease of fabrication and assembly coupled with reductions in waste and finishing operations, and, possibly most important, the availability of reliable design data. Nevertheless, it is no idle dream to suppose that improvements in fabrication techniques, the development of new plastics with certain characteristics in common with metals and increasing experience of proved applications will have a decisive effect on the engineering industry in the near future.

Plastics materials long ago caused a revolution in electrical engineering. 'Alkathene,' the ICI brand of polythene, has an important use in insulation for radar, radio, submarine telegraph and telephone, land telephone, television and low voltage domestic cables. In addition, Plastics Division offers the electrical engineer 'Fluon' PTFE, 'Maranyl' nylon, 'Corvic' and 'Welvic' PVC, 'Melinex' polyester film and 'Mouldrite' thermosetting products. These and other materials, notably 'Propathene,' are also being used extensively in any field of engineering which can take advantage of the unique combination of properties possessed by plastics.

The importance of metal to the engineer has already been emphasised, and it is not surprising that ICI should supply metal to the industry. Copper and copper alloys are put to a multitude of uses in the form of sheet, strip, extrusions and wire. The watch and clock industry and the manufacturers of food processing equipment, boilers, hot water cylinders, deep drawn articles, pen and pencil components and cartridge cases all depend on sheet and strip. The electrical industry uses extruded copper for busbars and switchgear components; general engineers use extrusions for making locks, hinges and curtain rails; and countless firms are employed in making vast quantities of nuts, bolts, screws and spindles. Wire is used for pins, nails, nuts, screws and all types of fasteners, including, of course, 'Lightning' zip fasteners. Among more specialised engineering products, 'Integron' finned tubes are used for heat exchangers, and Marston Excelsior Ltd. manufacture radiators, oil coolers and heat exchangers.

Copper was one of the first metals to be used by man to any extent but, to dispel any idea that the non-ferrous industry is not progressive, let it be said that IMI is Europe's largest manufacturer of the modern metal titanium! Titanium is much used in aircraft engineering because of its high strength/weight ratio and in chemical engineering because of its outstanding resistance to corrosion. Other IMI "new" metal products are zirconium for nuclear engineering and flash-bulbs, hafnium, tantalum, niobium and vanadium.

The Industrial Revolution was based on steam, and steam still remains in many workshops and factories a source of heat, if not of power. The Alfloc Water Treatment Service of ICI is available to offer advice on the use of water treatment chemicals, on the treatment of effluents, and on water treatment problems in general.

For reasons of space, this cannot be other than an outline of ICI's manifold connections with the engineering industry, to detail which would require a volume rather than a magazine article. It may, however, give to a reader not versed in the subject some idea of the diversity and versatility of the Company's contribution to the well-being of one of Britain's key industries and a hint or two of the fast-moving, ever-diversifying nature of the engineering industry itself.

Rotating like giant carcasses on spits, the bodies of Austin 1100 saloons are dipped in 'Granodine' 20

western and eastern halves. The total population of this semicircle is roughly ten million.

In many respects the various parts of the territory have much in common. About 85% of the area is jungle, with steep slopes and gullies. The coastal plains are often swampy. Rivers abound but are seldom navigable except for small craft. Communications are a problem.

The Federation of Malaya is joined to Singapore by a causeway carrying a road, a railway and water mains. There is thus easy connection between the two States. Moreover, the road systems of both are highly developed, although more so on the west side of the Federation than the east. The railway runs from Singapore the full length of the Federation, both to the north-west and the north-east, and continues into Thailand at both points. There are regular coastal steamer services between the various ports and an excellent internal air service. This last, of course, is something new since I first went to Malaya and has certainly revolutionised our ideas about the time taken to travel around the country.

Sarawak, Brunei and North Borneo present a much different picture. Kuching, the capital of Sarawak, is about a 360-mile sea journey from Singapore, and the State is intersected by rivers. There is no railway, and the road system is sketchy. A trunk road is under construction, but the swampy terrain makes progress slow. Travel from one part of the State to another is by sea, river or air.

North Borneo also suffers from lack of roads. There is a short length of railway running inland from the capital, Jesselton. Again travel is mostly by sea or air. The practical effect of all this is that whereas people and goods can move rapidly and easily around Malaya, in the North Borneo areas each town is relatively isolated from its neighbours and transfer of goods, being both slow and costly, is seldom feasible, and each place must therefore be to a large extent self-sufficient.

Political developments in the area, and changes in the pattern of trade, have resulted in alterations to the name of the Company. We started in 1931 as Imperial Chemical Industries (Malaya) Ltd., incorporated in Singapore. The Head Office was then in Singapore and our only other sales office was at Penang. Elsewhere we were represented by agents. We did, however, have two agricultural technical staff stationed at Kuala Lumpur from the very early days and also a representative attached to our agents in Bangkok. On 1st January 1940 we opened our own sales office in Kuala Lumpur.

In 1957 the Federation of Malaya came into being as a sovereign independent state. As a result of this change, and of the increasing growth of trade in agricultural products, it was thought advisable to split the Company into two parts—ICI (Malaya) Ltd., registered in Kuala Lumpur, and a branch of Imperial Chemical Industries (Export) Ltd., which was opened in Singapore.

The creation of Malaysia brought about further changes, the Singapore branch of ICI (Export) Ltd. being closed down and a sales office of ICI (Malaya) Ltd. taking its place on 1st October 1963, so that the territory is now entirely covered by the Company and its agents.

During my 30 years with the Company its trading pattern has changed considerably. Malaysia is the world's largest producer of natural rubber. Tin, iron ore, palm oil, coconut oil, pepper and timber are also major items in the economy, and there are oilfields in Sarawak and Brunei. All these contribute to the export trade of the area, but rubber is the most important commodity, followed by tin.

Singapore today is one of the world's great ports, and besides handling large tonnages of cargo also provides repair and bunkering facilities for ships. But 30 years ago Singapore depended very largely on its entrepot trade with neighbouring territories, as also did Penang. There were a number of industrial enterprises in both places, those of most interest to us being soap factories, biscuit factories, ice works, aerated water factories and factories for making rubber articles, mostly shoes. Our main sales products were industrial chemicals such as caustic soda, soda ash, silicate of soda, ammonium and sodium bicarbonate, sulphuric acid, anhydrous ammonia, calcium chloride and rubber chemicals. To the rubber plantation industry we sold little, except for formic acid for coagulating rubber latex, and much of this went through hundreds of small dealers in Singapore and Penang, who supplied the estates or other upcountry dealers with their requirements of tapping knives, baskets, etc. Our fertilizer trade was confined largely to sulphate of ammonia, which went mainly to vegetable and pepper growers.

We did not confine our sales only to products made by ICI, but traded on a merchanting basis in chemicals and allied products made by other firms, for some of whom we were sole agents for the territory and in other cases from whom we bought through Central Purchasing Department in London.

Thus it was that we sold nicotine extract to pepper growers, essences to soft drinks manufacturers, aluminium sulphate to waterworks, zinc oxide to rubber shoe factories and lump alum to bazaar dealers. I have even sold briar pipes, but that is another story!

I have no figures before me, but I

A young girl of Penambang village, N.E. Malaya, prepares silk thread for weaving

Kuala Lumpur, showing the very modern buildings and a super highway under construction

(Malaya) Ltd. and the Malaysian public.

These are some of the changes which have taken place within the Company—many more changes of course have been brought in the last 30 years to life in Malaya, not least to travel. In my early days it was usual to travel from Singapore to Port Swettenham or Penang by steamship, but this pleasant and restful method of travel is a thing of the past. The facilities are no longer there, or people won't or can't afford the time.

Business activity used to be very much centred on "Mail Day," which in Singapore was Friday of each week. Outward mail from the United Kingdom arrived by ship on one Friday and the reply was, or should have been, posted the following Friday to catch the next homeward sailing.

The ships took four weeks from London to Singapore, but as the mail went by rail from London to Marseilles and vice versa, and also I think by rail between Penang and Singapore, the transit time was 22 days. (Thirty years later sea mail from England took up to five weeks.)

Our peaceful business activities were of course transformed by the opening of regular air services between London and Singapore. Instead of having a week in which to reply to London's questions, with the reasonable certainty that some weeks would go by before they would be at us again, we eventually reached the stage where air mail took only a few days in either direction. There were no internal air services when I first went to Malaya, whereas today a traveller has the choice of several flights a day. After 30 years it is a little difficult to recall that getting about the country was not always so easy—but this is just one of many changes.

The sun had set and the dull green was lost in the dark. The lights of Singapore were fading fast astern. Thirty years had passed and I was leaving. I had seen the Company grow from a small trading firm of 70 to a sizeable company of 450. One factory was working and two more were being built. We had progressed and I was content.

University of Malaysia, Kuala Lumpur—the Arts Faculty

Wallerscote Wharf. River Weaver.
Maria Hodgett

main

BY any standards, I suppose, the steamship *Frances Poole* would be considered very small. Even in comparison with the other small vessels which carry the former Alkali Division's products from Wallerscote Wharf down the River Weaver and the Manchester Ship Canal to the Liverpool or Birkenhead Docks for transshipment to ocean-going vessels, she is one of the smallest. None the less she is a ship and therefore a lady. Furthermore she is a steamship—a rather elderly one, for she was born in 1923—and a true-hearted, faithful servant of those for whom she works.

The *Frances Poole*—to be done with vital, if rather tedious statistics—is a steam barge of 95 ft. 3 in. length; 23 ft. 1 in. breadth and a depth of 10 ft., built at Northwich by the local yard of Messrs. W.S. Yarwood & Sons. Her normal cargo capacity is 220 tons, on which her draught is a little over 9 ft. A steel-hulled, single-screw vessel, powered by a two-cylinder compound reciprocating engine and fired by a twin-furnaced boiler. Her full speed is in the region of eight knots.

Down the Weaver, when fully loaded, her speed is reduced to about four. There is no great surplus of water beneath her bottom in the Weaver when fully laden.

A hard-working and faithful servant of the Company for 41 years, summer and winter, peace and war! It can be no dishonour to serve in such a ship, however modest her dimensions or humble her calling. To serve those who serve mankind can never be other than honourable, and *Frances Poole*, be it remembered, carries cargoes which end their voyaging only in distant quarters of the globe, where they are put to fruitful uses.

I count the *Frances Poole* a very fortunate little ship. Her ways have moved through pleasant waters, she has been well cared for; if her days have lacked the adventure of her seagoing sisters they have been full of their own kind of incident and variety. Between the broad and turbulent Mersey and the narrow and tranquil Weaver she has come and gone, come and gone, in a fashion that has enabled her to draw sustenance from both.

I like to think of her, berthed insignificantly alongside the towering hull of some great ocean-going cargo vessel in the docks of Birkenhead, whispering to it gently in the dusk of the joys of the landsman's life and pursuits as she has observed them in the tranquil heart of the Cheshire countryside, and listening, a little shocked now and then and perhaps a little envious, to the merchantman's hoarse confidences of nights in Valparaiso.

To make the voyage down from Wallerscote to the Mersey on a June morning is both a pleasurable and an instructive experience.

A word of introduction on the wharf, and here is Captain Cyril Garnett of Winsford leading me down and on to the deck of his ship, about eight o'clock of what promises to be a fair morning. Steam is up and smoke coils from the blue and black-topped funnel. We have some 220 tons of caustic soda in drums below in the hold, to be delivered in the North Float at Birkenhead. Peter Edwards, not long come to the river service from true seafaring, is Mate, and Donald Hammond is Engineer. The *Frances Poole* is too small to be other than a happy ship, and one senses immediately the comradeship between the members of this trio, who between them man and navigate their little vessel and share her snug, tidy sleeping cabin-cum-saloon, right forward in the bows.

Two full-throated blasts on the steam whistle, a turn on the wheel, a gentle easing of the control valve to the engines, and we are away.

There is a something about the very simplest departure by boat which distinguishes it from any departure on land. Ropes are cast off, engines start to turn, whistles—steam or compressed air—blare their minatory warning—there is a feeling of finality, of the breaking of everyday ties. Even such a departure as this is no exception. Once away and heading downstream, the engine gently ticking to itself so that it resembles the sound of a rather accelerated grandfather clock, and we are a world to ourselves.

the bluffs and spurs of Frodsham and Kingsley show hard against our port skyline. Now we are passing Hatton's Hay and nearly at the end of the scenic part of our journey. Before us lie less delectable though not less productive vistas, the bridge and works at Sutton Weaver, Rocksavage Works, the huge new buildings of the Electricity Board opposite—Industrialism! Commerce!

Appropriately, the water of the river becomes stained and turbid.

At March Lock, the somewhat bleak entrance to the Manchester Ship Canal, however, a lark is singing high above our heads. The by now familiar sequence of lock operations enables us to chug out into the canal. The water here is of course a great deal deeper than in the Weaver, and we increase our speed. Revolutions are around 120 and speed about seven knots. But still, in the bows, there is no vestige of vibration, no whisper of noise—because we go by steam! At any moment we may encounter a large ocean-going vessel, one which will make our little steamer appear indeed a pigmy, but as the stone-buttressed banks and red sandstone cuts glide past, surprisingly, we have the canal to ourselves.

More tea is brewed and lunch is taken, mate, skipper and engineer having it in turns.

Rhythmically and reposefully mile succeeds mile until the first of the big seagoing ships appears, berthed alongside the oil depots and vast paper mills of Ellesmere Port. The time is now 1.40. By their intimidating bulk we trundle, urchin-like, towards Eastham Lock and the great sea-smelling expanses of the Mersey.

Imperceptibly the domesticity and rusticity of those enchanted early stretches of our progress have given place to a vaster, more disturbing atmosphere of space and salt water. As we enter this last of our land-locked gateways—shared with a Dutch diesel coaster which ignores us—we feel ourselves very much a ship and of the sea. And here we are, finally, one of the large company of ships of all kinds waiting upon the Mersey tide—coasters, tugs, dredgers, ferries, packet-boats and liners. The Mersey flood is silvery and smooth. Through a haze, fabulous and hardly to be credited landmarks are pointed out: "That is Liverpool Cathedral"; "there are the Royal Liver Buildings"; "that is the Cunard Building."

We begin to dip and dance a little. We actually—after a tug has passed quite close to us—ship a small sea.

And now, as more and ever larger ships surround us, as the lower reaches of the great river open out ahead, and Peter detects and hails an old shipmate of his on board an anchored tramp vessel, abruptly our voyage is over. The wheel is spun sharply to port, a cavernous opening in the high green-scaled and forbidding walls of the river's embankments is suddenly revealed, with a vast and forbidding gate at its extremity, and we find ourselves encaged. The time is around 4 o'clock.

It will be too long for me to wait for that forbidding gate, and a succession of further forbidding gates, to open—we are very small fry indeed in this labyrinth of seagoing commerce and our time will only come when the great ones have been served—and so perforce I take my leave of a gallant little ship and her complement.

Beneath the towering dockside the *Frances Poole* will wait with patience because no amount of impatience will shorten her waiting by a moment. But eventually the gates will open for her, as they already have for the huge *Clan Macgowan* of Liverpool and the *Andalian* of Valparaiso. To the comfortable chatter of her steam winch she has hoisted her derrick to the ready. The clamping wedges round her hatch covers have been knocked free. Eventually she will pass through those forbidding portals, find her berth and start the transhipment of those caustic drums she has carried down the Weaver to the steel caverns of some great ship's holds. Then she will cover up her hatches again, make ready for her homeward voyage, and, hardly noticed, steal away.

Salute, then, the *Frances Poole*, which has most deservingly earned her 40 years' long service award. And may this brief tribute stand as its citation.

NOVEMBER 5th, *by J. Blackmore (Central Purchasing Dept.)*